IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SOL IP, LLC, *Plaintiff*, v. AT&T MOBILITY LLC, *Defendant*, ERICSSON INC. and NOKIA OF AMERICA CORPORATION, *Intervenors.*	§	Case No. 2:18-cv-00526-RWS-RSP LEAD CASE
SPRINT COMMUNICATIONS COMPANY L.P., SPRINT SOLUTIONS, INC., and SPRINT SPECTRUM L.P., *Defendants*, ERICSSON INC. and NOKIA OF AMERICA CORPORATION, *Intervenors*.	§	Case No. 2:18-cv-00527-RWS-RSP CONSOLIDATED CASE
VERIZON COMMUNICATIONS INC. and CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS, *Defendants*, ERICSSON INC. and NOKIA OF AMERICA CORPORATION, *Intervenors*.	§	Case No. 2:18-cv-00528-RWS-RSP CONSOLIDATED CASE

CLAIM CONSTRUCTION
MEMORANDUM AND ORDER
REGARDING "LTE A" PATENTS

On December 4, 2019, the Court held a hearing to determine the proper construction of disputed claim terms within the group of patents referred to by the parties as the "LTE A" patents, namely United States Patents No. 8,270,354, 8,320,337, 8,593,936, 8,761,814, 8,971,168, 9,155,066, 9,265,063, 10,009,884, 10,231,211, and RE45,466. Having reviewed the arguments

made by the parties at the hearing and in their claim construction briefing (Dkt. Nos. 205, 226 & 233),[1] having considered the intrinsic evidence, and having made subsidiary factual findings about the extrinsic evidence, the Court hereby issues this Claim Construction Memorandum and Order. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc); *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015).

[1] Citations to documents (such as the parties' briefs and exhibits) in this Claim Construction Memorandum and Order refer to the page numbers of the original documents rather than the page numbers assigned by the Court's electronic docket unless otherwise indicated.

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I. BACKGROUND

Plaintiff Sol IP, LLC ("Plaintiff" or "Sol") has alleged patent infringement by Defendants AT&T Mobility LLC, Sprint Communications Co. LP, Sprint Solutions, Inc., Sprint Spectrum LP, and Cellco Partnership d/b/a Verizon Wireless ("Defendants"). At least for purposes of these claim construction proceedings, the parties use "Defendants" to also include Intervenor Ericsson Inc. (Dkt. No. 176 at 2; Dkt. No. 205 at 1 n.1) and Intervenor Nokia of America Corporation (*see* Dkt. No. 240; *see also* Dkt. No. 243, Nov. 18, 2019 Order).

Pursuant to the Court's September 9, 2019 Order (Dkt. No. 173), Plaintiff grouped the asserted patents into three groups, designated "LTE A" (or "LTE I"), "LTE B" (or "LTE II"), and "WiFi." *See* Dkt. No. 202. The present Claim Construction Memorandum and Order addresses the "LTE A" patents. These are United States Patents No. 8,270,354 ("the '354 Patent"), 8,320,337 ("the '337 Patent"), 8,593,936 ("the '936 Patent"), 8,761,814 ("the '814 Patent"), 8,971,168 ("the '168 Patent"), 9,155,066 ("the '066 Patent"), 9,265,063 ("the '063 Patent"), 10,009,884 ("the '884 Patent"), 10,231,211 ("the '211 Patent"), and RE45,466 ("the '466 Patent") (Dkt. No. 205, Exs. A1–A10).

Plaintiff submits that "[t]hese patents concern cellular communications, in particular communications between cell sites and mobile devices." Dkt. No. 205 at 2. Plaintiff also asserts that "[t]he cellular communication patents in this case relate to technologies incorporated into 3GPP's Long Term Evolution or LTE standards, also known as 4G." *Id.*

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with preliminary constructions with the aim of focusing the parties' arguments and facilitating discussion. Those preliminary constructions are noted below within the discussion for each term.

II. LEGAL PRINCIPLES

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claim construction is clearly an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). "In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period." *Teva*, 135 S. Ct. at 841 (citation omitted). "In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the 'evidentiary underpinnings' of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal." *Id.* (citing *Markman v. Westview Instruments, Inc,* 517 U.S. 370 (1996)).

To determine the meaning of the claims, courts start by considering the intrinsic evidence. *See Phillips*, 415 F.3d at 1313; *see also C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312–13; *accord Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can

be very instructive. *Id.* Other asserted or unasserted claims can aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id.* at 1315 (quoting *Markman*, 52 F.3d at 979). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *accord Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id.* The specification may also resolve the meaning of ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex*, 299 F.3d at 1325. But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims." *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998) (quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *accord Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics,*

Inc. v. Lifescan, Inc., 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent."). "[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985).

Although extrinsic evidence can be useful, it is "less significant than the intrinsic record in determining the legally operative meaning of claim language." *Phillips*, 415 F.3d at 1317 (citations and internal quotation marks omitted). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.*

The Supreme Court of the United States has "read [35 U.S.C.] § 112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). "A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005)

(citations and internal quotation marks omitted), *abrogated on other grounds by Nautilus,* 134 S. Ct. 2120.

III. THE PARTIES' STIPULATED TERMS

The parties submitted in their September 11, 2019 P.R. 4-3 Joint Claim Construction and Prehearing Statement that "[t]here are no currently agreed constructions." Dkt. No. 176 at 2.

IV. CONSTRUCTION OF DISPUTED TERMS IN THE PAGING PATENTS

Plaintiff refers to the '814 Patent, the '066 Patent, and the '211 Patent as the "Paging Patents." Dkt. No. 205 at 4. Plaintiff submits that these patents "teach a method of transmitting paging information that flexibly maps paging information into the base station's transmission while informing user equipment where to find such information." *Id.* at 4–5. Defendants submit that "[t]he Paging Patents' claims recite various alternative channel configurations for transmitting paging information." Dkt. No. 226 at 3.

The '814 Patent, titled "Method for Paging Information in Cellular System," issued on June 24, 2014, and bears an earliest priority date of April 26, 2006. The Abstract of the '814 Patent states:

> Provided is a method for transmitting paging information in a cellular system. An object of the method is transmitting paging information which can improve applicability of a limited radio resource by variably and flexibly setting up and mapping a transport channel and a physical channel in order to transmit information notifying start of downlink information from a base station to a terminal in a cellular system for packet transmission. The method includes the steps of: forming a paging channel (PCH) in a transport channel corresponding to generation of paging information; setting a paging indication channel (PICH) based on the paging information and forming the paging indication channel in a radio resource of a physical layer; and allocating the paging channel to the radio resource of the physical layer.

The '066 Patent resulted from a continuation of the '814 Patent, and the '211 Patent resulted from a continuation of the '066 Patent. Plaintiff submits that these three patents "share a

substantially similar specification." Dkt. No. 205 at 4. Defendants submit that "[t]he Paging Patents share an identical specification." Dkt. No. 226 at 2 n.1.

(A)A. "radio resource channel"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "physical shared channel."	Indefinite

Dkt. No. 176-1 at 1; Dkt. No. 205 at 6; Dkt. No. 226 at 13; Dkt. No. 253-1 at 1. The parties submit that this term appears in Claim 10 of the '814 Patent. *Id.*

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary construction: "physical channel in a wireless communication system."

(1) The Parties' Positions

Plaintiff submits that the claim at issue expressly recites that a radio resources channel is a physical channel, and "both the paging channel and the downlink shared channel are mapped to the same radio resource channel, making that radio resource channel a shared channel." Dkt. No. 205 at 6. Plaintiff argues that "[w]hile 'the radio resource channel' and 'the control channel' may have to be distinct *in the context of the claim*, no ambiguity arises merely because such terms have overlapping meanings *before* considering the other requirements of the claim." *Id.* (emphasis in original)

Defendants respond that "[t]he term 'radio resource channel' has no known meaning, either in the art generally or within the patent." Dkt. No. 226 at 13 (footnote omitted). Defendants also submit that "Claim 10's use of the separate terms 'physical channel' and 'radio resource channel' would indicate to a POSITA that [the] two terms differ in meaning," but "[t]he claim, however,

provides no guidance on the purported similarities or differences between these two terms." *Id.* at 14 (citation omitted). Defendants note that "[t]he term is *not used once* in the specification." *Id.* (emphasis in original). Defendants also discuss prosecution history and argue that "a POSITA would have understood that a 'radio resource channel' cannot be a radio frame or PCH block 12 as referred to during prosecution." *Id.* at 17. Finally, Defendants argue that "Sol IP's proposed alternative construction of 'physical shared channel' lacks any support in the intrinsic record and cannot be correct." *Id.* at 18.

Plaintiff replies that "Defendants' brief does not dispute that a 'channel' is a path for transmitting signals," and "[t]here is no requirement that claims use the *same* words as the written description." Dkt. No. 233 at 2 (emphasis in original).

(2) Analysis

Plaintiff submits technical definitions of "channel," such as "a path along which signals can be sent." Dkt. No. 205-12, *The Authoritative Dictionary of IEEE Standards Terms* 157–58 (7th ed. 2000).

Defendants submit the opinion of their expert that "radio resource channel" is not a known term of art. Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶ 37. Plaintiff does not show any established meaning for this term as a whole. Instead, Plaintiff argues that the meaning of this term is sufficiently clear in the context in which the term appears in the claim.

Claim 10 of the '814 Patent recites (emphasis added):

> 10. A method for transmitting paging information at a base station in a wireless communication system, the method comprising:
>
> when paging information is generated,
>
> mapping a paging channel including the paging information and a downlink shared channel for user data transmission into a *radio resource channel*;
>
> forming a physical layer frame comprising a control channel and the *radio resource channel*; and

transmitting the physical layer frame to a terminal,

wherein an identifier for notifying existence of the paging channel is transmitted through the control channel, and the control channel includes radio resource allocation information for the paging channel, and

when paging information is not generated, mapping the downlink shared channel into the *radio resource channel*,

wherein the paging channel and the downlink shared channel are transport channels, and *the control channel and the radio resource channel are physical channels*,

wherein the identifier is used by reserving and allocating a part of scheduling identifiers.

The distinct recitals of a "control channel," a "radio resource channel," and "physical channels" give rise to an inference that these different terms have different meanings. *See, e.g., CAE Screenplates Inc. v. Heinrich Fiedler GmbH & Co. KG*, 224 F.3d 1308, 1317 (Fed. Cir. 2000) ("In the absence of any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings.") (citation omitted).

The specification refers to channels but does not refer to a "radio resource channel" and therefore does not specify the meaning of this term. *See, e.g.,* '814 Patent at 1:15–22 ("paging channel (PCH)", "secondary common control physical channel (S-CCPCH)," "forward access channel (FACH)"), 2:1–6 (discussing LTE and WCDMA), 2:34–35 ("paging indication channel (PICH)"), 5:17–18 ("downlink shared channel (DL-SCH)") & 5:34–35 ("broadcasting channel (BCH)"). Nothing in the specification indicates whether one or more of these channels could be considered a "radio resource channel."

Nonetheless, the claim language is sufficiently clear on its face that a "radio resource channel" is a type of "physical channel" in the context of a wireless communication system. Other portions of the '814 Patent are consistent with this understanding. *See* '814 Patent at Abstract ("radio resource of a physical layer"); *see also id.* at 3:14 ("FIG. 6 shows a physical layer control channel"). The opinions of Defendants' expert to the contrary are unpersuasive. *See, e.g.,* Dkt.

No. 208-5, Sept. 11, 2019 Roy Decl. at ¶ 40 ("This confusion stems from the improper use of 'radio resource' to modify 'channel.' A POSITA would understand that a physical channel is transmitted over radio resources. Thus, one of the responsibilities of the network is to allocate 'radio resources' to particular 'physical channels.' *See, e.g.*, '814 Patent at 2:44 ("radio resource of a physical channel"); Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶¶ 39, 59 ("[A] radio resource channel cannot be a physical control channel because the claims of the '814 Patent differentiate the two.").

Defendants also cite prosecution history in which the patentee distinguished the "Choi" reference, United States Patent Application Publication No. 2004/0180675. *See* Dkt. No. 226-2, June 30, 2012 Response Under 37 C.F.R. §1.114 at SOL-FH-0001884, -90; *see also* Dkt. No. 226-3, Mar. 6, 2012 Office Action at SOL-FH-0001778; Dkt. No. 226-4, Nov. 23, 2011 Amendment at SOL-FH-0001766. Defendants argue that the patentee's statements regarding "radio resource channel (12, radio frame)" in Figure 4 (which illustrates "PCH block" 12) are internally inconsistent because "[a] POSITA would understand that a 'radio resource channel' cannot be both a block and a frame" and "a POSITA would have understood that a 'radio resource channel' cannot be a radio frame or PCH block 12 as referred to during prosecution." Dkt. No. 226 at 17; *see id.* at 15–17; *see also* Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶ 50 ("To the extent the Applicant was referring to element '12' of Figure 4 in the specification . . . , that reference also does not provide clarity. Element '12', shown as 'PCH block' . . . , is not defined as a radio frame and is only depicted as a part of a radio frame."); *id.* at ¶¶ 48–51.

Defendants identify no statements in the prosecution history regarding the meaning of "radio resource channel," let alone any definitive statements inconsistent with the claim language. *See, e.g., Omega Eng'g, Inc. v. Raytek Corp.*, 334 F.3d 1314, 1324 (Fed. Cir. 2003) ("As a basic

principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on *definitive statements* made during prosecution.") (emphasis added).

Finally, Plaintiff proposes also that a "radio resource channel" is a "shared" channel, but Plaintiff's proposal in this regard would tend to confuse rather than clarify the scope of the claim. Instead, other claim language already expressly addresses, for example, "mapping . . . into a radio resource channel."

The Court therefore hereby construes **"radio resource channel"** to mean **"physical channel in a wireless communication system."**

(A)B. "downlink shared channel" Terms

"downlink shared channel" ('066 Patent, Claim 10; '814 Patent, Claim 10)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "shared channel used for downlink."	"DL-SCH, a downlink transport channel for user data transmission"
"wherein . . . the downlink shared channel are physical channels" ('066 Patent, Claim 11)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning, with "downlink shared channel" construed as proposed above.	Indefinite

Dkt. No. 176-1 at 9; Dkt. No. 205 at 7; Dkt. No. 226 at 9; Dkt. No. 253-1 at 1 & 3.

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary constructions for these two disputed terms, respectively: "shared

channel used for downlink"; and "Plain meaning apart from the Court's construction of 'downlink shared channel.'"

(1) The Parties' Positions

Plaintiff argues that "Defendants seek to rewrite the claims to limit the 'downlink shared channel' to one embodiment," which "contradicts the clear claim language indicating that 'downlink shared channel' encompasses both physical channels and transport channels." Dkt. No. 205 at 7.

Defendants respond: "The dispute here centers on one issue: whether the DL-SCH, a transport channel, can also be a physical channel. In short, the answer is 'no.'" Dkt. No. 226 at 9. Defendants argue that "[t]he *only* specification support for the claims at issue promotes Defendants' proposed construction," and "Sol IP's claim differentiation argument cannot overcome the written description found in the specification or the prosecution history." *Id.* at 10 (emphasis in original). Defendants emphasize that "[w]hether or not claims differ from each other, one cannot interpret a claim to be broader than what is contained in the specification and claims as filed." *Id.* at 11 (quoting *Tandon Corp. v. U.S. Int'l Trade Comm'n*, 831 F.2d 1017, 1024 (Fed. Cir. 1987) (citation omitted).

Plaintiff replies that "Sol IP's construction is the clear meaning of the term, and defendants make no lexicography or disclaimer argument, so that should be the end of the story." Dkt. No. 233 at 2. Plaintiff argues: "Defendants misframe the issue as whether 'a transport channel[] can also be a physical channel.' Dkt. No. 226, at 9. The actual dispute is obviously whether the 'downlink shared channel' is limited to a transport channel at all." Dkt. No. 233 at 2 n.2. Plaintiff submits that Defendants "seek to limit the invention to the disclosed embodiment." *Id.* at 2–3. Plaintiff urges that "the claims here do not recite 'DL-SCH,' but rather 'downlink shared channel,'

meaning the claims always included *any* downlink shared channel and not just the *transport* downlink shared channel DL-SCH." *Id.* at 3.

(2) Analysis

Plaintiff's expert explains that, in the relevant field of communications, a network is viewed as having multiple layers, including a physical layer (the lowest layer, where data is transmitted over a physical transmission medium) and a transport layer (a higher layer, where data is delivered to different data services). Dkt. No. 208-1, Sept. 11, 2019 Wells Decl. at ¶ 46 nn.4–5. Defendants have not contested these general opinions.

Claims 10 and 11 of the '066 Patent recite (emphasis added)

> 10. A method for transmitting paging information, performed in a base station, the method comprising:
>
> when a paging information is generated, allocating the paging information to a *downlink shared channel*;
>
> allocating an identifier indicating existence of the paging information and a radio resource allocation information indicating radio resource to which the paging information is allocated to a control channel; and
>
> transmitting the control channel and the *downlink shared channel* to a terminal,
>
> wherein when the paging information is not generated, the identifier is not allocated to the control channel, and
>
> wherein the identifier is used by reserving and allocating a part of scheduling identifiers.
>
> 11. The method of claim 10, *wherein the control channel and the downlink shared channel are physical channels.*

The recital in dependent Claim 11 of the '066 Patent that the downlink shared channel is a physical channel suggests that the "downlink shared channel" introduced in Claim 10 of the '066 Patent may or may not be a physical channel. *See Phillips*, 415 F.3d at 1315 ("the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim").

Defendants note the principle that "[c]laim differentiation is not a hard and fast rule and will be overcome by a contrary construction dictated by the written description or prosecution history." *CardSoft, LLC v. VeriFone, Inc.*, 807 F.3d 1346, 1352 (Fed. Cir. 2015). Moreover, Defendants cite authority for the proposition that later-added dependent claims "cannot overcome the claim scope that is unambiguously prescribed by the specification." *Cave Consulting Grp., LLC v. OptumInsight, Inc.*, 725 F. App'x 988, 995 (Fed. Cir. Mar. 21, 2018).

Turning, then, to the remaining intrinsic evidence, Claim 10 of the '814 Patent recites a "downlink shared channel" that is a "transport channel" (emphasis added):

> 10. A method for transmitting paging information at a base station in a wireless communication system, the method comprising:
>
> when paging information is generated,
>
> *mapping* a paging channel including the paging information and a *downlink shared channel* for user data transmission *into a radio resource channel*;
>
> forming a physical layer frame comprising a control channel and the radio resource channel; and
>
> transmitting the physical layer frame to a terminal,
>
> wherein an identifier for notifying existence of the paging channel is transmitted through the control channel, and the control channel includes radio resource allocation information for the paging channel, and
>
> when paging information is not generated, mapping the *downlink shared channel* into the radio resource channel,
>
> *wherein the paging channel and the downlink shared channel are transport channels*, and the control channel and the radio resource channel are physical channels,
>
> wherein the identifier is used by reserving and allocating a part of scheduling identifiers.

In some cases, consistent usage of a term can justify a particular interpretation. *See Nystrom v. TREX Co., Inc.*, 424 F.3d 1136, 1144–45 (Fed. Cir. 2005) (construing "board" to mean "wood cut from a log," noting that in the intrinsic record the patentee "consistently used the term 'board' to refer to wood cut from a log," and stating that the patentee "is not entitled to a claim construction divorced from the context of the written description and prosecution history").

Defendants cite disclosure in the specification regarding the "DL-SCH" transport channel, which Defendants argue corresponds to the "downlink shared channel" recited in the claims:

> In the present embodiment, a method for dividing a location of the physical layer radio resource block for paging channel transmission into paging indication channel groups, and fixing and allocating the location of the physical layer radio resource block according to each group is adopted. When no paging information is generated (see 2 of FIG. 2), the paging channel does not exist in the transport channel of the radio frame (see 5 of FIG. 2). In this case, the paging indication channel is not also set up. Therefore, *downlink shared channel (DL-SCH)* information for user data transmission and not paging information of the paging channel is transmitted to the radio resource block location of the physical layer fixed and allocated for the paging channel.

'814 Patent at 5:9–21 (emphasis added). Also, Figure 4 of these patents refers to "transport channel DL-SCH."

Defendants further submit evidence that the LTE standardization community defined DL-SCH as a transport channel prior to the effective filing date of the '814 Patent. Dkt. No. 226-6, 3GPP TR 25.813 V0.3.0 at § 5.2.2 (DEFS-SOL-CC_00000050–51); *see Kopykake Enters., Inc. v. Lucks Co.*, 264 F.3d 1377, 1383 (Fed. Cir. 2001) ("[W]hen a claim term understood to have a narrow meaning when the application is filed later acquires a broader definition, the literal scope of the term is limited to what it was understood to mean at the time of filing.") (citation omitted).

Nonetheless, the above-reproduced passage refers to "the present embodiment," and Defendants fail to demonstrate that the specification defines the "downlink shared channel" recited in the claims as necessarily being a "DL-SCH" as that term is used in any industry standard. In particular, Defendants fail to show that the above-reproduced reference to "downlink shared channel (DL-SCH)" necessarily defines the term rather than merely setting forth an example. *See* '814 Patent at 5:9–21 ("[i]n the present embodiment"; "[i]n this case"); *see also CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) (to act as lexicographer the patentee must "*clearly* set forth a definition") (emphasis added). Further, although Figure 4 refers to a DL-

SCH as a transport channel, the specification refers to Figure 4 as illustrating an "embodiment" ('814 Patent at 3:7–9), and other disclosure in the specification refers to "DL-SCH" in the context of physical resources. *See id.* at 6:16–18 ("using available physical layer radio resources as DL-SCH for data information transmission").

Finally, Defendants cite opinions of Plaintiff's expert referring to a "DL-SCH transport channel." *See* Dkt. No. 208-1, Sept. 11, 2019 Wells Decl. at ¶¶ 40 & 47. Defendants fail to demonstrate any inconsistency between such opinions and Plaintiff's position that a downlink shared channel can be either a transport channel or a physical channel.

The Court therefore hereby expressly rejects Defendants' indefiniteness argument and hereby construes the disputed terms as set forth in the following chart:

Term	Construction
"downlink shared channel"	**"shared channel used for downlink"**
"wherein . . . the downlink shared channel are physical channels"	**Plain meaning (apart from the Court's construction of "downlink shared channel")**

(A)C. "scheduling identifiers" Terms

"scheduling identifiers" ('814 Patent, Claim 10; '066 Patent, Claim 10)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "scheduling identifier" means "identifier of a specific terminal or terminal group." "Scheduling identifiers" is the plural.	"cell radio network temporary identifiers (C-RNTIs)"

"the identifier is used by reserving and allocating a part of scheduling identifiers" ('814 Patent, Claim 10; '066 Patent, Claim 10)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "the identifier is a reserved and allocated part of the scheduling identifiers."	"the identifier is used by reserving and allocating a part of the information included in the terminal [scheduling identifier] as a group identifier for paging information"

Dkt. No. 176-1 at 4; Dkt. No. 205 at 8; Dkt. No. 226 at 3 & 7; Dkt. No. 253-1 at 1–2.

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary construction for these two disputed terms, respectively: "identifiers that identify specific terminals or terminal groups and that are used for scheduling"; and "Plain meaning apart from the Court's construction of 'scheduling identifiers.'"

(1) The Parties' Positions

Plaintiff submits that "Defendants agree that the 'terminal scheduling ID' described in the specification corresponds to the 'scheduling identifier' of the claims." Dkt. No. 205 at 9. Plaintiff argues that Defendants' proposal "contradicts the patent specification" and "is also contrary to the doctrine of claim differentiation." *Id.*

As to "scheduling identifiers," Defendants respond that they propose the explicit definition set forth in the specification for this disputed term. Dkt. No. 226 at 3–4. Defendants also submit that "during prosecution, the applicant explained that a 'C-RNTI indicates that scheduling information,' as opposed to other information, is being transmitted." *Id.* at 5. Further, Defendants argue that Plaintiff's alternative proposed construction should be rejected because "it seeks to eviscerate the concept of 'scheduling' from the term *altogether*." *Id.* (emphasis in original). Finally, Defendants urge that "claim differentiation cannot override an express definition," and,

moreover, the patentee added the dependent claims here at issue after the filing of the original application. *Id.* at 6; *see id.* at 6–7.

As to "the identifier is used by reserving and allocating, a part of scheduling identifiers," Defendants respond that "the specification defines the identifier when discussing 'the present invention.'" *Id.* at 7 (citing '814 Patent at 5:53–63). Defendants argue: "Here, the identifier has two features. First, the identifier is a '*part of*' the scheduling identifier. Second, the identifier is used as a '*group identifier*' for paging. Defendants' construction, which is taken verbatim from the specification, captures both key features." Dkt. No. 226 at 7 (emphasis in original).

Plaintiff replies that "'i.e.' is not a magic incantation," and "[t]he specification refers to an identifier for 'identifying a specific terminal or a terminal group.'" Dkt. No. 233 at 3 & 4. Plaintiff also argues that Defendants' arguments discounting the dependent claims should be rejected because "the first recitation of 'scheduling identifiers' was also added by the same amendment." *Id.* at 4–5.

(2) Analysis

Defendants' expert opines that a POSITA would understand that a C-RNTI is an identifier used for scheduling, consistent with the specification's definition," that "[a] C-RNTI 'provides a unique UE identification at the cell level,'" and that "[i]t is assumed that this identity is used for scheduling." Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶¶ 64 (citing "DEFS-SOL-CC_00002861, 3GPP TR 25.813 V0.8.3 § 5.6.2; DEFS-SOL-CC_00002905, 3GPP TS 25.813 V7.1.0 § 5.6.2").

In some cases, "the specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess," and "[i]n such cases, the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316. Here, the specification discloses:

> *The terminal scheduling ID is an ID for identifying a specific terminal or a terminal group between the terminal and the scheduler of the base station.* As shown in FIG. 5, *the present invention* is operated by reserving and allocating a part of the information included in the terminal scheduling ID as a group ID for paging information. The group ID is an ID used by reserving and allocating a part of a *scheduling ID (i.e., a cell radio network temporary identifier (C-RNTI))* for uniquely identifying a terminal. A base station may operate by reserving at least one scheduling ID.

'814 Patent at 5:53–62 (emphasis added). The parties agree that "scheduling ID" is an abbreviation for "scheduling identifier." *See, e.g.*, Dkt. No. 205 at 9; Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶¶ 62–63; Dkt. No. 226 at 4 n.2.

Defendants argue that this usage of "i.e." amounts to a definition of "scheduling ID." Defendants cite authority for the proposition that "the specification's use of 'i.e.' signals an intent to define the word to which it refers." *Edwards Lifesciences LLC v. Cook Inc.*, 582 F.3d 1322, 1334 (Fed. Cir. 2009); *see, e.g., Abbott Labs. v. Novopharm Ltd.*, 323 F.3d 1324, 1327, 1330 (Fed. Cir. 2003).

Yet, to act as lexicographer the patentee must "*clearly* set forth a definition." *CCS Fitness*, 288 F.3d at 1366 (emphasis added). The above-reproduced passage begins by explicitly referring to what the terminal scheduling ID "is," thereby weighing against reading the separate "i.e." parenthetical as definitional. *See* '814 Patent at 5:53–55. Indeed, Defendants' proposal that the "i.e." parenthetical defines "scheduling ID" is inconsistent with this disclosure that the terminal scheduling ID can "identify[] a specific terminal *or a terminal group*." *Id.* (emphasis added).

A better reading of this paragraph in the specification, read as a whole, is that the "i.e" parenthetical refers not just to "scheduling ID" but rather to the larger phrase that surrounds the parenthetical, "a scheduling ID . . . for uniquely identifying a terminal." *Id.* at 5:58–62. The Court thus rejects Defendants' argument that the "i.e." parenthetical defines the term "scheduling identifier."

The appearance of "e.g." elsewhere in the specification, cited by Defendants, does not compel otherwise. '814 Patent at 4:66–67 ("e.g., a time index and a sub-carrier index"). Defendants' reliance on the reference to "the present invention" in the above-reproduced disclosure is likewise unavailing.

Defendants submit extrinsic evidence regarding C-RNTIs being used for scheduling. Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶ 64. This evidence, however, does not limit scheduling to using C-RNTIs and does not demonstrate that the term "scheduling identifier" has such a limited meaning in the relevant art.

Defendants also submit prosecution history in which the patentee stated:

> [I]n 3GPP1, the PI-ID and the C-RNTI serve different functions, that is, they are used to indicate what type of information is transmitted on the DSCCH. Specifically, the use of the PI-ID indicates that a paging indicator is allocated in the DSCCH. In this situation, the UE receives the paging information through the DPSCH by reading the paging indicator in the DSCCH, determining that the paging indicator belongs to the UE, and then reading the resource indicating of the DPSCH in the DSCCH. On the other hand, the use of *the C-RNTI indicates that scheduling information instead of a paging indicator is allocated in the DSCCH*. In this situation, the UE receives data through the DPSCH based on the scheduling information.

Dkt. No. 226-5, Nov. 12, 2013 Response Under 37 C.F.R. §1.116 at 8 (emphasis added). Defendants argue that the patentee thereby linked "C-RNTI" with "scheduling information," but Defendants fail to identify any clear definition or disclaimer in this prosecution history. *See, e.g.*, *Omega Eng'g*, 334 F.3d at 1324 ("As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public's reliance on definitive statements made during prosecution.").

Dependent Claim 18 of the '814 Patent provides additional support for rejecting Defendants' narrow interpretation of "scheduling identifiers." Claims 10 and 18 of the '814 Patent recite (emphasis added):

10. A method for transmitting paging information at a base station in a wireless communication system, the method comprising:

when paging information is generated,

mapping a paging channel including the paging information and a downlink shared channel for user data transmission into a radio resource channel;

forming a physical layer frame comprising a control channel and the radio resource channel; and

transmitting the physical layer frame to a terminal,

wherein an identifier for notifying existence of the paging channel is transmitted through the control channel, and the control channel includes radio resource allocation information for the paging channel, and

when paging information is not generated, mapping the downlink shared channel into the radio resource channel,

wherein the paging channel and the downlink shared channel are transport channels, and the control channel and the radio resource channel are physical channels,

wherein *the identifier is used by reserving and allocating a part of scheduling identifiers*.

* * *

18. The method of claim 10, *the scheduling identifiers are RNTIs (Radio Network temporary identifiers).*

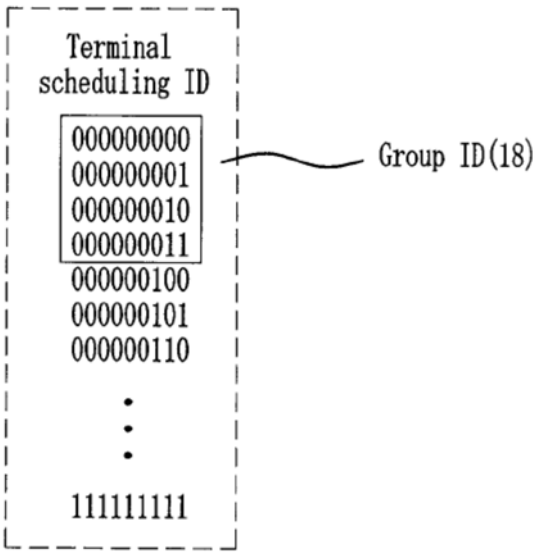
Defendants note the principle that "[c]laim differentiation is not a hard and fast rule and will be overcome by a contrary construction dictated by the written description or prosecution history," *CardSoft*, 807 F.3d at 1352, and that later-added dependent claims "cannot overcome the claim scope that is unambiguously prescribed by the specification," *Cave Consulting*, 725 F. App'x at 995. Regardless of the weight that can be attributed to the doctrine of claim differentiation here, the recital in dependent Claim 18 that "the scheduling identifiers are RNTIs" is consistent with the absence of any clear lexicography as discussed above. Indeed, Defendants' expert acknowledges that in the relevant field there exist several different types of "RNTIs." Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶ 95.

Finally, Defendants argue that "the Paging Patents simply do not describe *any* other embodiment where something other than a C-RNTI is used as a scheduling identifier" (Dkt. No. 226 at 4 (emphasis in original)), but the Federal Circuit has "expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment." *Phillips*, 415 F.3d at 1323.

As to Plaintiff's proposed interpretation, however, Plaintiff's alternative proposal of "identifier of a specific terminal or terminal group" fails to account for the word "scheduling" in the term "scheduling identifiers." *See Merck & Co. v. Teva Pharm. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005) ("A claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so."). The term "scheduling identifiers" should therefore be construed to refer to identifiers that identify specific terminals or terminal groups and that are used for scheduling. At the December 4, 2019 hearing, Plaintiff expressed agreement with the Court's preliminary construction (set forth above).

As to the term "the identifier is used by reserving and allocating a part of scheduling identifiers," this language is readily understandable, particularly when read in light of the context provided by the specification. For example, Figure 5 illustrates a "Group ID(18)" as part of a "Terminal scheduling ID." Figure 5 is reproduced here:

FIG. 5



The specification discloses that "[a]s shown in FIG. 5, the present invention is operated by reserving and allocating a part of the information included in the terminal scheduling ID as a group ID for paging information." '814 Patent at 5:55–58. The specification also discloses that "[p]art of the terminal scheduling ID may be reserved, allocated and used by a group ID, and more than one group ID may be reserved and allocated according to the capability of the terminal." *Id.* at 6:22–25. Defendants' proposal of referring to information included in the terminal scheduling identifier as a group identifier for paging information is therefore unnecessary in light of the Court's construction of "scheduling identifiers."

Otherwise, Defendants' proposal essentially merely repeats the language of the disputed term itself. Because Defendants' proposed construction would tend to confuse rather than clarify the scope of the claims, the Court hereby expressly rejects Defendants' proposal construction. No further construction is necessary. *See O2 Micro*, 521 F.3d at 1362 ("[D]istrict courts are not (and should not be) required to construe every limitation present in a patent's asserted claims."); *see*

also Finjan, Inc. v. Secure Computing Corp., 626 F.3d 1197, 1207 (Fed. Cir. 2010) ("Unlike *O2 Micro*, where the court failed to resolve the parties' quarrel, the district court rejected Defendants' construction."); *Summit 6, LLC v. Samsung Elecs. Co., Ltd.*, 802 F.3d 1283, 1291 (Fed. Cir. 2015).

The Court therefore hereby construes the disputed terms as set forth in the following chart:

Term	Construction
"scheduling identifiers"	**"identifiers that identify specific terminals or terminal groups and that are used for scheduling"**
"the identifier is used by reserving and allocating a part of scheduling identifiers"	**Plain meaning (apart from the Court's construction of "scheduling identifiers")**

(A)D. "the identifier exists or not according to whether or not the paging information is generated"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "the identifier exists or not depending on whether or not the paging information is generated."	Indefinite

Dkt. No. 176-1 at 7–8; Dkt. No. 205 at 11. The parties submit that this term appears in Claims 6 and 15 of the '814 Patent. Dkt. No. 226 at 1–2.

Defendants submit that "the parties have agreed that th[is] . . . term[] do[es] not require construction." Dkt. No. 226 at 1–2. At the December 4, 2019 hearing, the parties confirmed their agreement in this regard. Based on this agreement reached by the parties, the Court hereby construes **"the identifier exists or not according to whether or not the paging information is generated"** to have its **plain meaning**.

(A)E. "the first signal"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
"the first information"	Indefinite

Dkt. No. 176-1 at 14; Dkt. No. 205 at 12; Dkt. No. 226 at 12; Dkt. No. 253-1 at 3. The parties submit that this term appears in Claim 29 of the '211 Patent. *Id.*

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary construction: "The antecedent basis for 'the first signal' is 'first information.'"

(1) The Parties' Positions

Plaintiff argues that "there is a clear and unambiguous antecedent," namely "the first information," and "[t]here are no other elements recited with numbers that are plausible alternatives." Dkt. No. 205 at 12 & 13. Plaintiff also notes similar limitations in Claim 8 of the '211 Patent. *Id.* at 14.

Defendants respond that "[t]he term 'the first signal' in claim 29 is indefinite because it lacks antecedent basis," and "[n]either the specification nor the prosecution history illuminate the meaning of the term with any reasonable certainty." Dkt. No. 226 at 12. Defendants also argue that "[t]he prosecution history . . . confirms that 'signal' and 'information' are not synonymous, as the applicant amended the allowed claims to recite 'information' instead of 'signal.'" *Id.*

Plaintiff replies that "Defendants cannot (and do not) deny that a POSITA [(person of ordinary skill in the art)] would understand that 'information' in a data transmission may also be referred to as a signal." Dkt. No. 233 at 6 (citations and internal quotation marks omitted).

(2) Analysis

Claim 29 of the '211 Patent recites (emphasis added):

29. A communication apparatus, comprising:

a memory; and

at least one processor coupled to the memory,

wherein the at least one processor, when executing program instructions stored in the memory, is configured to:

cause the apparatus to *receive first information* through a control channel in a subframe, wherein the subframe comprises the control channel and a shared channel and at least a portion of *the first information* indicates physical layer radio resources;

determine that an identifier is used *in the first signal*, wherein the identifier indicates that paging information is transmitted through the shared channel in the subframe; and

cause the apparatus to obtain, without determining whether or not the paging information is intended for the apparatus, the paging information transmitted through the shared channel in the subframe in response to the identifier being used in *the first information*, wherein the paging information is obtained based on the physical layer radio resources indicated by the portion of *the first information*.

On one hand, in some cases, lack of antecedent basis can result in indefiniteness. *See Halliburton Energy Servs., Inc. v. M-I LLC*, 514 F.3d 1244, 1249 (Fed. Cir. 2008) ("[A] claim could be indefinite if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable."). On the other hand, antecedent basis can be implicit rather than explicit. *See Energizer Holdings Inc. v. Int'l Trade Comm'n*, 435 F.3d 1366, 1371 (Fed. Cir. 2006).

On balance, reading the claim as a whole, the antecedent basis for "the first signal" is the "first information" recited in the preceding limitation. *See id.* (holding that "an anode gel comprised of zinc as the active anode component" provided implicit antecedent basis for "said zinc anode").

Plaintiff also notes that Claim 8 of the '211 Patent recites "determine that an identifier is used in *the first information*." On one hand, "in the absence of any evidence to the contrary, we

must presume that the use of these different terms in the claims connotes different meanings." *CAE Screenplates*, 224 F.3d at 1317. On the other hand, the consistency between this language in Claim 8 and Plaintiff's interpretation of similar language in Claim 29 (in which the disputed term appears) is noteworthy. *See Phillips*, 415 F.3d at 1314 ("Other claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment as to the meaning of a claim term.").

Further, Plaintiff submits extrinsic evidence that a "signal" is understood in the relevant art as being "used to convey information." Dkt. No. 208-1, Sept. 11, 2019 Wells Decl. at ¶ 78 (citing "The Authoritative Dictionary of IEEE Standards Terms, p. 1047 (7th ed. 2000)"). The specification is consistent with this understanding that a "signal" conveys "information." *See* '211 Patent at 7:23–29 ("In the RRC_Connected state, when the terminal performs power saving operation of monitoring a downlink *signal* on monitoring duration according to the discontinuous reception/discontinuous transmission cycle, a paging procedure similar to the RRC_Idle state is required in the monitoring duration of the terminal to start transmitting *information* on the downlink.") (emphasis added).

The prosecution history cited by Defendants does not compel otherwise. During prosecution, the patentee replaced "signal" with "information" in multiple instances throughout the claims. *See* Dkt. No. 226-7, Oct. 3, 2018 Amendment Filed with Request for Continued Examination Under 37 C.F.R. § 1.114 at 2–10. Although "[i]n the absence of any evidence to the contrary, we must presume that the use of these different terms in the claims connotes different meanings," *CAE Screenplates*, 224 F.3d at 1317, the antecedent basis relationship in Claim 29 of the '211 Patent is reasonably clear in the context of the claim as a whole, particularly when read in light of the other evidence discussed above. *See, e.g., Halliburton*, 514 F.3d at 1249; *Energizer*,

435 F.3d at 1371; *Nautilus*, 134 S. Ct. at 2129. Finally, despite Defendants' arguments, this antecedent basis finding does not amount to "redrafting" the claim. *See, e.g., Process Control Corp. v. HydReclaim Corp.*, 190 F.3d 1350, 1357 (Fed. Cir. 1999) ("we do not permit courts to redraft claims") (citations omitted).

Thus, Defendants fail to demonstrate that the claim is indefinite. *See Sonix Tech. Co., Ltd. v. Publ'ns Intl., Ltd.*, 844 F.3d 1370, 1377 (Fed. Cir. 2017) ("Indefiniteness must be proven by clear and convincing evidence."). No further construction is necessary beyond the antecedent basis.

The Court therefore hereby finds that **the antecedent basis for "the first signal" is "first information."**

V. CONSTRUCTION OF DISPUTED TERMS IN THE RANDOM ACCESS PATENTS

Plaintiff refers to the '466 Patent, the '354 Patent, and the '063 Patent as the "Random Access Patents." Plaintiff submits that these patents "concern the process of random access in cellular communications," and "[r]andom access is the process whereby a mobile station obtains network access and uplink timing synchronization with the base station." Dkt. No. 205 at 15. Defendants submit that "[t]he two patents relate to different random access procedures, one in which the user equipment initiates the communication, and one in which the base station initiates the communication." Dkt. No. 226 at 18.

The '466 Patent, titled "System and Method for Transmitting Random Access Data Using Orthogonal Frequency Division Multiple Access," issued on April 14, 2015, and bears an earliest priority date of December 11, 2003. The Abstract of the '466 Patent states:

> Disclosed is a random access data transmission system and method using OFDMA. The system includes a scheduling ID into an access grant on a preamble for a random access, and transmits it together with an acknowledgment or a non-acknowledgment of the preamble, a base station uses the scheduling ID to notify the mobile station of a random access data transmittable time and a data

> transmission channel through a control channel, and the mobile station transmits a preamble in advance. After receiving a transmission assignment instruction corresponding to a scheduling ID through the control channel, the mobile station transmits random access data through an assigned channel.

The ’354 Patent, titled “Method for Transmitting Up Link Control Signal in Mobile Communication System,” issued on September 18, 2012, and bears an earliest priority date of May 3, 2006. The Abstract of the ’354 Patent states:

> The present invention relates to a method for transmitting uplink control information in a mobile communication system; and, more particularly, to a method for effectively forming uplink control information transmitted through a downlink from a base station to a terminal in a mobile communication system for providing a packet service and transmitting the uplink control information with minimum radio resources occupied. The method includes the steps of generating uplink control information; allocating the uplink control information to a downlink-shared radio resource for packet data transmission based on downlink scheduling information; and transmitting the radio resource to a terminal. The present invention is applied to a mobile communication system.

The ’063 Patent, titled “Method to Transmit Downlink Signaling Message on Cellular Systems for Packet Transmission and Method for Receiving the Message,” issued on February 16, 2016, and bears an earliest priority date of June 21, 2006. The Abstract of the ’063 Patent states:

> Provided is a downlink control information transmitting and receiving method which can maximize the use of limited radio resources by effectively forming an uplink signaling message to be transmitted from a base station to a terminal and transmitting the formed uplink signaling message with a minimum amount of radio resources occupied. The method for transmitting downlink data generation indication information for a base station to inform a terminal of packet data transmission in a packet-based cellular system, includes the steps of: a) generating the downlink data generation indication information; b) recording radio resource allocation information in downlink scheduling information for transmitting the downlink data generation indication information, and allocating information for the downlink data generation indication information to downlink-shared radio resources; and c) transmitting the downlink scheduling information and the information for the downlink data generation indication information according to a transmission cycle.

(A)F. "the scheduling ID is specific for the mobile station and identification for random access procedure"

Plaintiff's Proposed Construction	Defendants' Proposed Construction
Plain and ordinary meaning Alternatively, "the scheduling ID is specific for the mobile station, for use in a random access procedure"	Indefinite

Dkt. No. 176-1 at 19–20; Dkt. No. 205 at 16; Dkt. No. 226 at 19; Dkt. No. 253-1 at 4. The parties submit that this term appears in Claim 21 of the '466 Patent. *Id.*

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary construction: "the scheduling ID is specific for the mobile station and is specific for identification for a random access procedure."

(1) The Parties' Positions

Plaintiff submits that "defendants' expert contends the term is indefinite because it is 'unclear . . . whether or not the scheduling ID is tied to a specific preamble or to a particular mobile device.'" Dkt. No. 205 at 16 (quoting Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶ 156). Plaintiff argues that "[t]his is a manufactured controversy" because "[t]he claim language *only* requires that the scheduling ID be specific for the mobile station and says *nothing* about whether it might also be tied to a specific preamble." Dkt. No. 205 at 16 (citations and internal quotation marks omitted) (emphasis in original).

Defendants respond that "[t]his claim term is indefinite because it is susceptible to multiple, different interpretations, and a POSITA would not understand how to resolve the ambiguity created by the different and conflicting interpretations." Dkt. No. 226 at 19. Defendants argue that "Sol IP's proposal is unsupportable because it seeks to remove the ambiguity by limiting the

scope of the term to one possible interpretation while excluding other possible interpretations expressly described in the specification." *Id.* at 20.

Plaintiff replies that "[w]hile this phrase could have been drafted more clearly, it conveys that (1) the scheduling ID is specific for the mobile station and (2) the scheduling ID is an identification for a random access procedure." Dkt. No. 233 at 7.

(2) Analysis

Claim 21 of the '466 Patent recites (emphasis added):

> 21. A random access method in a wireless communication system, the method at a base station comprising:
>
> receiving a preamble, without a random access message, through preamble transmission channel from a mobile station;
>
> *transmitting a preamble response message that conveys a scheduling ID* and an assignment information of radio resource of data transmission channel *for random access data transmission*; and
>
> receiving random access data from the mobile station through the radio resource of data transmission channel assigned to the mobile station,
>
> *wherein the scheduling ID is specific for the mobile station and identification for random access procedure*,
>
> wherein the preamble is generated by using a code that is distinguishable from other codes,
>
> wherein the random access data is transmitted after the preamble is transmitted and the preamble response message is received in response to the preamble, and
>
> wherein the scheduling ID is used for a physical layer and a Medium Access Control (MAC) layer of the mobile station.

A fair reading of the disputed limitation, in the context of the "random access method" of the claim as a whole, is that the phrase "is specific for" modifies not only "for the mobile station" but also the phrase "identification for random access procedure." In other words, in addition to the scheduling ID being specific to a particular mobile station, the scheduling ID is specific to a particular random access procedure (rather than potentially also being used for identification as part of some other procedure).

The specification is consistent with this understanding, disclosing that a scheduling ID is used to identify a mobile station as part of random access, and disclosing that a scheduling ID can be "recover[ed]" after finishing receiving random access data:

> When the base station 200 *finishes receiving the random access data* through the data receiving processor 250, the ID manager 220 *recovers and manages the scheduling ID assigned to the corresponding mobile station* in step S10.
>
> As described, the base station 200 assigns data transmission channels for variably transmitting the random access data according to assigned resource status to the access grant of the preamble transmitted from the mobile station.
>
> To achieve this, the base station 200 provides a specific scheduling ID for each preamble when transmitting an access grant on the preamble received from the mobile station to the downlink, and notifies the mobile station of assignment information on the data transmission channel determined through the scheduling ID.
>
> It is desirable to use the scheduling ID as an identifier of the mobile station used by the scheduler 230 and use the same for the physical layer and the MAC layer.

'466 Patent at 7:24–40 (emphasis added).

Defendants' arguments regarding other potential interpretations are unpersuasive. Defendants urge that "a POSITA is left to wonder if the claim term refers to a scheduling ID that 'is specific for a mobile station,' 'is specific for . . . identification for random access procedure,' or is specific 'for each preamble' received." Dkt. No. 226 at 19. The above-reproduced disclosure refers to "provid[ing] a specific scheduling ID for each preamble," but no such limitation is apparent in Claim 21 of the '466 Patent. The opinions of Defendants' expert are likewise unpersuasive. *See* Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶¶ 152–57. Finally, despite Defendants' arguments, the above-discussed reading of the claim language as a whole does not amount to "redrafting" the claim. *See, e.g.*, *Process Control*, 190 F.3d at 1357 ("[W]e do not permit courts to redraft claims.") (citations omitted).

The Court thus rejects Defendants' indefiniteness arguments. At the December 4, 2019 hearing, Defendants submitted that if the Court rejects Defendants' indefiniteness arguments, then Defendants agree with the Court's preliminary construction. In response at the hearing, Plaintiff likewise expressed agreement with the Court's preliminary construction.

The Court accordingly hereby construes **"the scheduling ID is specific for the mobile station and identification for random access procedure"** to mean **"the scheduling ID is specific for the mobile station and is specific for identification for a random access procedure."**

(A)G. "responses for random access for a plurality of terminals"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "random access responses for [a/the] plurality of terminals."	Indefinite

Dkt. No. 176-1 at 18; Dkt. No. 205 at 17. The parties submit that this term appears in Claims 1, 4, 10, and 13 of the '354 Patent. Dkt. No. 226 at 1–2.

Defendants submit that "the parties have agreed that th[is] . . . term[] do[es] not require construction." Dkt. No. 226 at 1–2. At the December 4, 2019 hearing, the parties confirmed their agreement in this regard. Based on this agreement reached by the parties, the Court hereby construes **"responses for random access for a plurality of terminals"** to have its **plain meaning**.

(A)H. "random access preamble" Terms

"an own random access preamble" ('063 Patent, Claims 1, 3)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "a terminal's single random access preamble"	"random access preamble not shared with other equipment"
"the single random access preamble" ('063 Patent, Claim 3)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "the terminal's own single random access preamble"	Indefinite

Dkt. No. 176-1 at 22–23; Dkt. No. 226 at 22; Dkt. No. 253-1 at 5 & 6–7.

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary construction for these two disputed terms, respectively: "a single random access preamble not shared with other equipment in the wireless communication system"; and "the own random access preamble."

(1) The Parties' Positions

Plaintiff argues that "[w]hile the claims containing these terms were not drafted perfectly, defendants' approach to construction of these terms is premised on *trying to find ambiguity* to exploit rather than considering the claims, specification, and prosecution history as a whole to find clarity." Dkt. No. 205 at 18 (emphasis in original). Plaintiff also argues that "[f]undamental to understanding these terms is the '063 Patent's clear teaching that a mobile terminal has its own

random access preamble, which it transmits to a base station," and "a mobile terminal of the invention has its 'own' 'single' random access preamble." *Id.* at 19. Plaintiff urges that "[t]he patent and file history only ever talk about one 'single random access preamble,' and this is the terminal's own such preamble." *Id.* at 20.

Defendants respond: "[T]he term 'own random access preamble' means what it says: a preamble that is not shared with other equipment. The term 'the single random access preamble' has no meaning because it lacks antecedent basis." Dkt. No. 226 at 23. "Alternatively, Defendants agree that ['own random access preamble'] can also be construed in terms of the two characteristics that Sol IP notes were used to define the preambles during prosecution as 'one random access preamble that is not shared with other equipment.'" *Id.* As to "the single random access preamble," Defendants urge that "Sol IP conflates the two words 'own' and 'single' to propose rewriting the claim," and "[c]onflating these two separately recited terms does not make any logical sense, nor does it help a POSITA understand the claim's meaning." *Id.* at 24.

Plaintiff replies: "Defendants might argue the preamble must be globally unique (even outside the relevant cell) or cannot be reused after the random access process is over, even though neither argument would be supported by the specification. Defendants' construction must be properly limited to 'not shared with other equipment *performing random access with the same base station at the same time*.'" Dkt. No. 233 at 8 (emphasis in original). Plaintiff also argues that "[t]he article 'the' plainly suggests that 'the single random access preamble' has an antecedent basis, and the only plausible antecedent is 'own random access preamble.'" *Id.*

(2) Analysis

The term "own random access preamble" appears in independent Claims 1 and 3 of the '066 Patent. The parties agree that an "own random access preamble" is a single preamble, and

the parties agree that an "own random access preamble" is not shared with other equipment. *See* Dkt. No. 226 at 22–23; *see also* Dkt. No. 205 at 24 ("[D]uring the course of prosecution, the applicants came to define these particular preambles as exhibiting two characteristics: (1) they were one preamble, and (2) that preamble was not shared with other equipment."); Dkt. No. 226-9, June 16, 2015 Submission with Request for Continued Examination Under 37 CFR §1.114 at 6 (distinguishing the "Park" reference, arguing: "Even if a random-access signature were transmitted in a random-access preamble, however, that would still not amount to 'an own random access preamble' as recited in claim 17, since there's no indication in Park that the random-access preamble is *not shared with other equipment*") (emphasis modified). The specification is consistent with this understanding. *See, e.g.,* '063 Patent at 7:61–8:6 ("[I]f bit information corresponding to the own preamble signature is set as 0, it means that the base station did not receive the preamble signature tried by oneself."); *id.* at 8:24–28.

At the December 4, 2019 hearing, the parties agreed as a general matter that "an own random access preamble" is not shared with other equipment, but Plaintiff urged that "not shared" means not shared as to a particular base station at a particular time. Defendants responded that the claims recite "a base station," which in patent parlance means one or more base stations. Both of the claims here at issue recite "an own random access preamble" in relation to "a base station." For example, Claim 1 of the '063 Patent recites "an own random access preamble used for the random access from a base station." The Court's construction therefore need not address the possibility of multiple base stations because the claims already provide context in that regard.

Finally, the parties also discussed at the December 4, 2019 hearing whether the Court's construction should include a temporal limitation as to the preambles not being shared at the same time. The parties identified no intrinsic evidence bearing on this issue. On its face, however, the

phrase "not shared" implies a reasonably clear temporal limitation as to using a particular preamble that is not being used by any other device in the context of the recited methods. Further, at the December 4, 2019 hearing, the parties agreed that "not shared with other equipment" is directed to avoiding conflicts between devices.

Based on the foregoing, the Court construes "own random access preamble" to mean "a single random access preamble not shared with other equipment."

As for "the single random access preamble," this term appears in independent Claim 3 of the '063 Patent, which recites (emphasis added):

> 3. A method for supporting random access of a terminal in a base station of a wireless communication system, the method comprising:
>
> transmitting, when downlink data to the terminal during discontinuous reception (DRX) in an active state, where the terminal has set up a data channel for transmitting/receiving data to/from a base station, is generated, downlink data generation indication information indicating an *own random access preamble* used for the random access to the terminal;
>
> receiving *the single random access preamble* indicated by the downlink data generation indication information from the terminal; and
>
> transmitting a response for the random access to the terminal after receiving *the single random access preamble*, wherein the response is allocated to downlink-shared radio resource and transmitted to the terminal,
>
> wherein the response for the random access is addressed using an identifier informing transmission of the response for the random access,
>
> wherein the identifier is reserved and allocated among scheduling identifiers used in the wireless communication system, and transmitted through a channel carrying downlink scheduling information,
>
> wherein the identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and a time, and
>
> wherein the downlink data generation indication information is transmitted through a control message using a unique scheduling identifier for the terminal during Radio Resource Control (RRC) connected state.

Defendants emphasize that "the use of both terms in close proximity in the same claim gives rise to an inference that a different meaning should be assigned to each." *Bancorp Servs., LLC v. Hartford Life Ins. Co.*, 359 F.3d 1367, 1373 (Fed. Cir. 2004). Further, a lack of antecedent basis can result in indefiniteness. *See Halliburton*, 514 F.3d at 1249 ("a claim could be indefinite

if a term does not have proper antecedent basis where such basis is not otherwise present by implication or the meaning is not reasonably ascertainable"). On the other hand, antecedent basis can be implicit rather than explicit. *See Energizer*, 435 F.3d at 1371.

Reading the claim as a whole, the step of "receiving the single random access preamble *indicated by the downlink data generation indication information*" refers back to the preceding "transmitting" limitation, which recites "*downlink data generation indication information indicating* an own random access preamble." Thus, the "single random access preamble" is the same as the "own random access preamble." *See Energizer*, 435 F.3d at 1371 (holding that "an anode gel comprised of zinc as the active anode component" provided implicit antecedent basis for "said zinc anode").

This reading is consistent with the Interview Summary cited by the parties, which describes a discussion between the patent examiner and a representative of the patentee. The "Substance of Interview" portion of this Interview Summary states as follows:

> Applicant and Examiner discussed the combination of the Park and Chun references and how they were applied in the rejection of claim 17 under 35 U.S.C. 103(a). Applicant and Examiner further discussed proposed amendments to claim 17 to distinguish the claimed invention from the Park and Chun references. In particular, Applicant proposed amending claim 17 to recite receiving "only one" random access preamble from a base station. In order to further distinguish the claimed invention from the Chun reference, *the Examiner suggested specifying in the claims that the terminal has its "own" preamble*, instead of being allocated one of several available preamble signatures as disclosed by Chun.

Dkt. No. 226-11, Jan. 10, 2014 Applicant-Initiated Interview Summary (SOL-FH-0026140) (regarding telephonic interview held on January 6, 2014) (emphasis added). The patentee amended the claims in response to this suggestion by the examiner: "Claims 17 and 23 have been amended to recite the terminal having an information indicating *an own* random access preamble used for the random access, in substantial accord with the Examiner's suggestion. The Examiner's

suggestion is appreciated." Dkt. No. 205-13, Feb. 7, 2014 Submission with Request for Continued Examination Under 37 C.F.R. § 1.114 at 5 (SOL-FH-0026156); *see id.* at 1–5 (SOL-FH-0026152–56).

Based on the foregoing, the opinions of Defendants' expert that "single" random access preamble cannot refer to "own" random access preamble are unpersuasive. *See* Dkt. No. 208-5, Sept. 11, 2019 Roy Decl. at ¶¶ 187–91.

The Court therefore hereby construes the disputed terms as set forth in the following chart:

Term	Construction
"own random access preamble"	**"a single random access preamble not shared with other equipment"**
"the single random access preamble"	**"the own random access preamble"**

(A)I. "informing transmission"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Construing "informing transmission" (the language originally proposed by defendants for construction): Plain and ordinary meaning. Alternatively, "providing notice of transmission"	Indefinite

Dkt. No. 176-1 at 21; Dkt. No. 205 at 21. The parties submit that this term appears in Claims 1 and 3 of the '063 Patent. Dkt. No. 253-1 at 6.

Defendants submit that "to narrow the parties' disputes, Defendants have accepted Sol IP's proposed construction." Dkt. No. 226 at 2; *see* Dkt. No. 253-1 at 6. At the December 4, 2019 hearing, the parties confirmed their agreement in this regard.

The Court therefore hereby construes **"informing transmission"** to mean **"providing notice of transmission."**

(A)J. "the identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and time"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning	"the group scheduling identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and time"

Dkt. No. 176-1 at 20; Dkt. No. 205 at 23; Dkt. No. 226 at 20; Dkt. No. 253-1 at 5–6. The parties submit that this term appears in Claims 1 and 3 of the '063 Patent. *Id.*

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary construction: "Plain meaning[,] [r]ejecting Defendants' proposal to include 'group scheduling identifier' language."

(1) The Parties' Positions

Plaintiff argues that "Defendants' construction wrongly limits the term 'identifier' to a specific disclosed embodiment—namely that of a 'group scheduling identifier.'" Dkt. No. 205 at 24. Plaintiff also argues that Defendants' proposal "would introduce substantial ambiguity and confusion into the claims" as to whether there are two separate identifiers. *Id.*; *see id.* at 25.

Defendants respond that "Defendants' proposed construction for this term recognizes the definitional statements made in the '063 patent's specification and the clear disclaimer made during prosecution." Dkt. No. 226 at 20. Defendants also argue that "[i]f 'the identifier' is properly construed to mean 'the group scheduling identifier,' then there would be no ambiguity as to whether the claim's prior references to 'an identifier' likewise refer to the group scheduling identifier." *Id.* at 22.

Plaintiff replies that Defendants "attempt to import a specific embodiment into the construction of this phrase" and that "[t]he prosecution record does not reflect a clear and unequivocal disclaimer of claim scope." Dkt. No. 233 at 9. Plaintiff also argues that "[D]efendants' construction would introduce confusion into the claim" because "there is zero textual or other support for construing the first instance of 'an identifier' as a 'group scheduling identifier,' and the term 'an identifier' is not before the Court for construction." *Id.*

(2) Analysis

Claims 1 and 3 of the '063 Patent recite (emphasis added):

> 1. A method for performing random access in a terminal of a wireless communication system, the method comprising:
>
> receiving, when downlink data is generated during discontinuous reception (DRX) in an active state where the terminal has set up a data channel for transmitting/receiving data to/from a base station, downlink data generation indication information indicating an own random access preamble used for the random access from a base station;
>
> transmitting the random access preamble indicated by the downlink data generation indication information to the base station; and
>
> receiving a response for the random access from the base station, wherein the response is allocated to downlink-shared radio resource and transmitted from the base station,
>
> wherein the response for the random access is addressed using *an identifier* informing transmission of the response for the random access,
>
> wherein *the identifier* is reserved and allocated among scheduling identifiers used in the wireless communication system, and received through a channel carrying downlink scheduling information,
>
> *wherein the identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and a time*, and
>
> wherein the downlink data generation indication information is received through a control message using a unique scheduling identifier for the terminal during Radio Resource Control (RRC) connected state.
>
> * * *
>
> 3. A method for supporting random access of a terminal in a base station of a wireless communication system, the method comprising:
>
> transmitting, when downlink data to the terminal during discontinuous reception (DRX) in an active state, where the terminal has set up a data channel for transmitting/receiving data to/from a base station, is generated, downlink data

generation indication information indicating an own random access preamble used for the random access to the terminal;

receiving the single random access preamble indicated by the downlink data generation indication information from the terminal; and

transmitting a response for the random access to the terminal after receiving the single random access preamble, wherein the response is allocated to downlink-shared radio resource and transmitted to the terminal,

wherein the response for the random access is addressed using *an identifier* informing transmission of the response for the random access,

wherein *the identifier* is reserved and allocated among scheduling identifiers used in the wireless communication system, and transmitted through a channel carrying downlink scheduling information,

wherein the identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and a time, and

wherein the downlink data generation indication information is transmitted through a control message using a unique scheduling identifier for the terminal during Radio Resource Control (RRC) connected state.

Each claim thus refers to "identifier" in three instances and does not refer to a "group scheduling identifier." Defendants rely upon the specification as well as prosecution history as support for their proposal of interpreting "identifier" as referring to a "group scheduling identifier." The specification discloses:

A part of a scheduling identifier used for scheduling is reserved and allocated as a group scheduling identifier, and the transmission of response information for random access is addressed using the group scheduling identifier.

* * *

FIG. 3 is a diagram illustrating reserving and using a *group scheduling identifier* allocated for transmitting a part of a scheduling identifier, grant information, and downlink data generation indication information for scheduling radio resources in accordance with an embodiment of the present invention.

If a scheduling identifier is reserved and used, a scheduler allocates scheduling identifiers to each of terminals except a group scheduling identifier when the terminals access a base station. A group scheduling identifier for transmitting the grant information can be used by *reserving and allocating a group scheduling identifier* according to a random access burst that is configured by a base station where the random access burst may be a *random access resource region expressed in a frequency and a time*.

'063 Patent at 7:3–7 & 11:27–41 (emphasis added).

Defendants fail to show, however, that "reserv[ing]" and "allocat[ing]" are relevant only in the context of a "group scheduling identifier." *See id.*; *see also id.* at 10:66–11:2. Likewise, Defendants fail to show that a "random access resource region expressed in a frequency and a time" is relevant only in the context of a "group scheduling identifier." *See id.* at 11:27–41.

Turning to the prosecution history, Defendants cite the following passage in which the patentee distinguished the "LG" and "Park" references:

> *In the claimed invention*, the *group scheduling identifier* can vary according to the time-frequency resource region for random access. The last clause of claim 17, in particular, recites:
>
> > Wherein the *identifier* is determined based on a resource region for random access, the resource region being expressed in a frequency and a time.
>
> Neither LG nor Park teaches, discloses, or suggests "the identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and a time," as recited in claim 17.

Dkt. No. 226-8, Apr. 8, 2015 Amendment After Final Rejection at 5 (SOL-FH-0026230) (emphasis added); *see* Dkt. No. 226-9, June 16, 2015 Submission with Request for Continued Examination Under 37 CFR §1.114 at 7 (SOL-FH-0026252) (similar).

In some cases, "[w]hen a patent . . . describes the features of the 'present invention' as a whole, this description limits the scope of the invention." *Regents of Univ. of Minn. v. AGA Med. Corp.*, 717 F.3d 929, 936 (Fed. Cir. 2013) (quoting *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1308 (Fed. Cir. 2007)).

Here, on balance, these statements by the patentee neither amount to a clear lexicography nor constitute a clear and unmistakable disclaimer that would warrant limiting "identifier" to meaning "group scheduling identifier." *See CCS Fitness*, 288 F.3d at 1366 ("the claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and *clearly* set forth

a definition of the disputed claim term in either the specification or prosecution history") (emphasis added); *see also Massachusetts Inst. of Tech. v. Shire Pharm., Inc.*, 839 F.3d 1111, 1119 (Fed. Cir. 2016) ("The party seeking to invoke prosecution history disclaimer bears the burden of proving the existence of a 'clear and unmistakable' disclaimer that would have been evident to one skilled in the art.") (citation and quotation marks omitted); *Omega Eng'g*, 334 F.3d at 1325 ("To balance the importance of public notice and the right of patentees to seek broad patent coverage, we have thus consistently rejected prosecution statements too vague or ambiguous to qualify as a disavowal of claim scope."). The context provided by surrounding claim language reinforces this conclusion, as each of the above-reproduced claims recite an "identifier" in multiple instances. *See Phillips*, 415 F.3d at 1314 ("the context of the surrounding words of the claim also must be considered in determining the ordinary and customary meaning of those terms") (citation and quotation marks omitted).

The Court therefore hereby expressly rejects Defendants' proposed construction. No further construction is necessary. *See O2 Micro*, 521 F.3d at 1362 ("[D]istrict courts are not (and should not be) required to construe every limitation present in a patent's asserted claims."); *see also Finjan*, 626 F.3d at 1207 ("Unlike *O2 Micro*, where the court failed to resolve the parties' quarrel, the district court rejected Defendants' construction."); *Summit 6*, 802 F.3d at 1291.

The Court therefore hereby construes **"the identifier is determined based on a resource region for random access, the resource region being expressed in a frequency and time"** to have its **plain meaning**.

VI. CONSTRUCTION OF DISPUTED TERMS IN THE CARRIER AGGREGATION PATENTS

Plaintiff refers to the '168 Patent as being one of the "Carrier Aggregation Patents." Plaintiff submits that "[c]arrier aggregation refers to the combining of two or more carriers (radio

frequencies) into one data channel to increase the data capacity." Dkt. No. 205 at 25. Defendants submit that "the '168 patent discloses multiplying data symbols by so-called orthogonal sequences and scrambling sequences in order to randomize intra-cell and inter-cell interference." Dkt. No. 226 at 25.

The '168 Patent, titled "Carrier Aggregation in Wireless Communications Systems," issued on March 3, 2015, and bears an earliest priority date of January 11, 2010. The Abstract of the '168 Patent states:

> Provided is a data transmission system using a carrier aggregation. The data transmission system may assign a radio resource based on a correspondence relationship between a downlink and an uplink, and may transmit data using the assigned radio resource.

(A)K. "index" Terms

"an index of a third orthogonal sequence of another UE" ('168 Patent, Claims 22, 23) **"an index of a fourth orthogonal sequence of the another UE"** ('168 Patent, Claims 22, 23)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning	Indefinite

Dkt. No. 176-1 at 38–39; Dkt. No. 205 at 26; Dkt. No. 226 at 25; Dkt. No. 253-1 at 8.

Shortly before the start of the December 4, 2019 hearing, the Court provided the parties with the following preliminary constructions for these two disputed terms: "an index of a third orthogonal sequence of another UE, wherein the third orthogonal sequence is selected from orthogonal sequences listed in Table 5"; and "an index of a fourth orthogonal sequence of the another UE, wherein the fourth orthogonal sequence is selected from orthogonal sequences listed in Table 6."

(1) The Parties' Positions

Plaintiff argues that "the 'index of a fourth orthogonal sequence of the another UE' comes from Table 6 because it is recited as 'adjacent' to the 'index of the second orthogonal sequence' that unquestionably comes from Table 6." Dkt. No. 205 at 27. Plaintiff presents a similar argument as to Table 5 and the term "an index of a third orthogonal sequence of another UE." *Id.* Plaintiff submits that the specification is also consistent with Plaintiff's interpretation of these disputed terms. *See id.* at 28.

Defendants respond that "the claims never say *what table* the claimed sequences (and thus the claimed index of those sequences) are selected from. This lack of clarity is further reinforced as the claims never define—and Sol IP never addresses—what is meant by the index 'adjacency' requirement of claims 22 and 23." Dkt. No. 226 at 25 (emphasis in original).

Plaintiff replies that "Defendants fail to consider the record evidence as a whole; indeed, they do not even view *each claim* as a whole." Dkt. No. 233 at 9 (emphasis in original). Plaintiff submits that "Defendants find ambiguity in the fact that there are 'at least nine tables in the specification,' Dkt. No. 226, at 26, ignoring that the relevant ones are *in the claims themselves*." Dkt. No. 233 at 10 (emphasis in original).

(2) Analysis

Claims 22 and 23 of the '168 Patent depend from Claim 18, and Claims 18, 22, and 23 of the '168 Patent recite (emphasis added):

> 18. A method for wireless communication by a base station (BS), comprising:
> receiving a first slot and a second slot from at least one User Equipment(UE), the first slot includes five DFT-S-OFDM symbols and the second slot includes four DFT-S-OFDM symbols; and
> processing the first slot and the second slot to detect data symbols,
> wherein in the first slot a plurality of data symbols are multiplied with a first scrambling sequence and a first orthogonal sequence, in the second slot a plurality

of data symbols are multiplied with a second scrambling sequence and a second orthogonal sequence;

wherein the first orthogonal sequence is selected from orthogonal sequences listed in Table 5 and the second orthogonal sequence is selected from orthogonal sequences listed in Table 6, and

wherein the sequence index of the first orthogonal sequence is the same as the sequence index of the second orthogonal sequence.

Table 5

Sequence Index	DFT Sequence
0	$[1\ 1\ 1\ 1\ 1]$
1	$[1\ e^{j2\pi/5}\ e^{j4\pi/5}\ e^{j6\pi/5}\ e^{j8\pi/5}]$
2	$[1\ e^{j4\pi/5}\ e^{j8\pi/5}\ e^{j12\pi/5}\ e^{j16\pi/5}]$
3	$[1\ e^{j6\pi/5}\ e^{j12\pi/5}\ e^{j18\pi/5}\ e^{j24\pi/5}]$

Table 6

Sequence Index	Walsh Sequence
0	$[1\ 1\ 1\ 1]$
1	$[1\ -1\ 1\ -1]$
2	$[1\ 1\ -1\ -1]$
3	$[1\ -1\ -1\ 1]$

* * *

22. The method of claim 18, wherein if the index of the first orthogonal sequence of the UE and *an index of a third orthogonal sequence of another UE* using the first scrambling sequence in the first slot are *adjacent*, the index of the second orthogonal sequence and *an index of a fourth orthogonal sequence of the another UE* using the second scrambling sequence in the second slot are *adjacent*,

wherein the another UE uses the first scrambling sequence and the third orthogonal sequence to multiply a plurality of data symbol that are mapped into the first slot, and the second scrambling sequence and the fourth orthogonal sequence to multiply a plurality of data symbols that are mapped into the second slot, and

wherein the UE and the another UE use the same resource to transmit data symbols.

23. The method of claim 18, wherein if the index of the first orthogonal sequence of the UE and *an index of a third orthogonal sequence of another UE* using the first scrambling sequence in the first slot are *not adjacent*, the index of the second

orthogonal sequence and *an index of a fourth orthogonal sequence of the another UE* using the second scrambling sequence in the second slot are *not adjacent*,

wherein the another UE uses the first scrambling sequence and the third orthogonal sequence to multiply a plurality of data symbol that are mapped into the first slot, and the second scrambling sequence and the fourth orthogonal sequence to multiply a plurality of data symbols that are mapped into the second slot, and

wherein the UE and the another UE use the same resource to transmit data symbols.

Defendants argue that "there is no indication at all as to which tables the third and fourth sequences are selected from," and "there are at least nine tables in the specification that contain "orthogonal sequences" organized by "sequence index." Dkt. No. 226 at 26. Defendants also emphasize the principle that "[t]he fact that [one] can articulate a definition supported by the specification, however, does not end the inquiry. . . . [T]he claim is still indefinite if a person of ordinary skill in the art cannot translate the definition into meaningfully precise claim scope." *Halliburton*, 514 F.3d at 1251.

Because Claim 18 recites that "the first orthogonal sequence is selected from orthogonal sequences listed in Table 5," "the index of the first orthogonal sequence of the UE" in dependent Claims 22 and 23 is selected from Table 5. Because Claims 22 and 23 recite that the first and third indices are "adjacent" (Claim 22) and "not adjacent" (Claim 23), a fair reading of the claims as a whole is that the "index of a third orthogonal sequence of another UE" also must be selected from Table 5. Likewise, the "index of a fourth orthogonal sequence of the another UE" comes from Table 6 because it is recited as "adjacent" (Claim 22) or "not adjacent" (Claim 23) to "the index of the second orthogonal sequence" that Claim 18 recites is selected from Table 6.

Defendants urge, "[f]or example, the 'not adjacent' language could refer—in the absence of any guidance otherwise—to two indexes that are from different tables." Dkt. No. 226 at 26. Reading the claims as a whole, however, the "adjacent" and "not adjacent" limitations in Claims

22 and 23 appear in the context of the tables set forth in Claim 18, from which Claims 22 and 23 depend.

The specification is consistent with this reading of the claims:

> Referring to the Walsh sequence of Table 34, an amount of interference between sequences using neighboring indices may be less than an amount of interference between sequences using non-neighboring indices. Accordingly, when two terminals use neighboring DFT sequences in the first slot, the two terminals may be configured to use neighboring Walsh sequences in the second slot. When the two terminals use non-neighboring DFT sequences in the first slot, the two terminals may be configured to use non-neighboring Walsh sequences in the second slot.

'168 Patent at 32:21−30. Although this disclosure refers to "neighboring" rather than "adjacent," this usage of "neighboring" (in the context of this disclosure) is sufficiently similar to "adjacent" (in the context of the claims) such that this disclosure provides additional support for what is already apparent on the face of the claims, as discussed above. Of note, this disclosure "refer[s]" to one particular Table. *See id.*

The claims also provide context in terms of the number of symbols in each of the recited slots. Reading Claims 18, 22, and 23, the first orthogonal sequence and the third orthogonal sequence both relate to the "first slot," the "first slot" includes five symbols, and the first orthogonal sequence is selected from Table 5, in which each sequence has five elements. Because the third orthogonal sequence relates to the "first slot," a fair reading of these claims is that the third orthogonal sequence also has five elements and is also selected from Table 5. Likewise, the second orthogonal sequence and the fourth orthogonal sequence both relate to the "second slot," the "second slot" includes four symbols, and the second orthogonal sequence is selected from Table 6, in which each sequence includes four elements. Because the fourth orthogonal sequence relates to the "second slot," a fair reading of these claims is that the fourth orthogonal sequence

also has four elements and is also selected from Table 6. The specification is consistent with this understanding. *See id.* at 33:26–47.

The contrary opinions of Defendants' expert are unpersuasive. *See* Dkt. No. 208-3, Sept. 11, 2019 Haimovich Decl. at ¶¶ 89–104. For example, Defendants do not adequately support the assertion that "a POSITA may consider two indices from *different tables* to be 'adjacent' if they are in numerical sequence." Dkt. No. 226 at 27 (citing Dkt. No. 208-3, Sept. 11, 2019 Haimovich Decl. at ¶¶ 93 & 95) (emphasis in original).

The Court therefore hereby rejects Defendants' indefiniteness arguments and hereby construes these disputed terms as set forth in the following chart:

Term	Construction
"an index of a third orthogonal sequence of another UE"	**"an index of a third orthogonal sequence of another UE, wherein the third orthogonal sequence is selected from orthogonal sequences listed in Table 5"**
"an index of a fourth orthogonal sequence of the another UE"	**"an index of a fourth orthogonal sequence of the another UE, wherein the fourth orthogonal sequence is selected from orthogonal sequences listed in Table 6"**

VII. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit. The parties are ordered to not refer to each other's claim construction positions in the presence of the jury. Likewise, in the presence of the jury, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court. The Court's reasoning in this order binds the testimony of any witnesses, and any reference to the claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 16th day of December, 2019.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE